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WMO SPACE PROGRAMME

1. Overall objective and scope

The overall objective of the WMO Space Programme (WMO SP) is to promote wide availability and utilization of satellite data and products for weather, climate, water and related applications of WMO Members.

Its scope is to coordinate environmental satellite matters and activities throughout all WMO Programmes; to give guidance to these programmes on the potential of remote-sensing techniques in meteorology, hydrology and related disciplines and applications; and to ensure effective cooperation with and among international partners and organizations dealing with satellite systems.

2. Programme structure

The WMO SP has four main components:

- (a) Integrated space-based observing system;
- (b) Availability and use of satellite data and products;
- (c) Information and training;
- (d) Space Weather coordination.

3. Programme governance

The lead technical responsibility for the WMO SP is assigned to CBS. The WMO Consultative Meetings on High-level Policy on Satellite Matters (CM) maintain a broad policy overview of the Programme.

Space Weather activities are jointly overseen by CBS and CAeM.

4. Programme activities

4.1 Integrated Space-based Observing System

Long-term objective

The long-term objective is to develop an integrated space-based observing system involving operational and R&D environmental satellites and their associated ground segments. This observing system should support the WWW, as the space-based component of its GOS; and ultimately all the other WMO Programmes and WMO-supported programmes, as the space-based component of the WMO Integrated Global Observing System (WIGOS).

Activities

The space components of the various observing systems are reviewed, and the gaps with respect to requirements are analyzed, in order to optimize the effectiveness of each component while striving for cross-cutting integration in the context of WIGOS.

WMO SP leads the revision of the baseline for the space-based observing system to achieve full implementation of the "Vision for the GOS in 2025". It promotes intercalibration of satellite instruments and harmonization of their specifications. It encourages operational and R&D space agencies to contribute to the GOS and pursue system harmonization with best practices.

The transition of mature research systems to operational status is encouraged when appropriate, with a view to improve operational capabilities in line with evolving requirements, while ensuring the long-term sustainability required for operational applications and climate monitoring.

4.2 Availability and use of satellite data and products

Long-term objective

In view of the exponential increase in satellite data which is anticipated from upcoming satellite systems, a major challenge for the WMO SP in the next decade is to make these improved data and derived products available while increasing the number and geographical spread of users.

The objective is to enhance timely accessibility of satellite data and products as required by users in all WMO Regions, in particular in developing countries, to promote data interoperability through WMO Information System (WIS) standards and practices, and to stimulate coordinated processing of observations to derived products with traceable quality.

Activities

The WMO SP serves as a catalyst for improving dissemination and exchange of satellite observation data and products, and for standardizing data and metadata management consistent with WIS practices.

The Integrated Global Data Dissemination Service (IGDDS) project focuses on: (i) establishing regional requirements for access to data and products; (ii) implementing sustainable regional Digital Video Broadcast by Satellite (DVB-S) dissemination systems offering cost efficient access to satellite data in every region; (iii) integrating all relevant data types in such broadcast services, including inter-regionally exchanged data; and (iv) supporting harmonization of future Direct Broadcast systems as well as complementary data access and distribution services via the Internet, recognizing different user needs.

Building on international science groups and projects, the WMO SP stimulates the coordinated processing of satellite data to products, and the traceable quality of these data and products. Particular attention is given to climate applications, e.g. through the Sustained Coordinated Processing of Environmental Satellite Data for Climate Monitoring (SCOPE-CM) and to Disaster Risk Reduction.

Cooperation is encouraged to develop common basic tools for utilization of remote-sensing data, and on the assimilation of R&D and new operational data streams in NWP systems and climate models.

4.3 Information and Training

Long-term objective

The long-term objective is to raise awareness on satellite capabilities and promote satellite-related education to keep Members' operational and scientific staff up to date with the latest technological innovations, with a focus on developing countries.

Activities

The WMO SP implements the Five-year Strategy for the Virtual Laboratory for Training and Education in Satellite Meteorology and Environmental Applications (VLab), relying on the network of Centres of Excellence sponsored by satellite operators. Close links are maintained with relevant national and international education and training initiatives.

WMO SP ensures that appropriate websites and portals provide guidance on the availability and usability of satellite data, products and services. Information material is to be provided, and translated into the official WMO languages as resources allow. Participation of WMO Members from developing countries in satellite users' conferences is encouraged.

4.4 Space Weather coordination

Long-term objective

The long-term objective is to support international operational coordination for Space Weather, which has a severe impact on space assets and relies to a large extent on space-borne observations, and improve Space Weather warnings to major application areas including aviation.

Activities

Within available resources, through the Inter-Programme Coordination Team on Space Weather (ICTSW), the WMO SP supports coordination activities focussing on:

- (a) Standardization and enhancement of Space Weather data exchange and delivery through the WIS;
- (b) Harmonized definition of end-products and services, including e.g. quality assurance guidelines and emergency warning procedures, in interaction with aviation and other major application sectors;
- (c) Integration of Space Weather observations, through review of space- and surface-based observation requirements, harmonization of sensor specifications, monitoring plans for Space Weather observation;
- (d) Encouraging the dialogue between the research and operational Space Weather communities.

5. Coordination and partnership

WMO SP is conducted in partnership with space agencies of WMO Members and their coordination bodies: the Coordination Group for Meteorological Satellites (CGMS) and the Committee on Earth Observation Satellites (CEOS).

Participation in the WMO Consultative Meetings on High-level Policy on Satellite Matters (CM) provides space agencies with visibility on the WMO SP and related WMO strategy and expectations.

Through the WMO SP, WMO actively participates in CGMS, the main technical coordination body of space agencies for operational missions for weather or climate on such matters as orbit coordination, contingency planning, data dissemination formats, or data collection services. WMO

and CGMS have jointly initiated and are supporting a number of projects (related, for example, to satellite calibration, data dissemination, product generation, or training).

The WMO SP represents WMO as an Associate of CEOS, and interacts with its relevant entities such as the Working Group on Calibration and Validation, and the CEOS Working Group on Climate. Some WMO SP activities, such as maintaining the Dossier on the Space-based GOS, are conducted in collaboration with CEOS.

WMO SP supports expert groups that play a key role in providing expert advice and feedback, and stimulating developments within the user community. These groups include the International Winds Working Group, the International TOVS Working Group, the International Precipitation Working Group, the International Radio-occultation Working Group, and the Space Frequency Coordination Group.

Through its participation in international bodies, WMO SP promotes an integrated, global, space-based observing system, encourages cooperation whilst discouraging unnecessary duplication.
